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WHERE EAST MEETS WEST: THE CONSERVATION OF A MODERN, LARGE-SCALE, BLACK LACQUER SCULPTURE EXHIBITED IN A PUBLIC SPACE

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Abstract

A non-representational, black lacquer sculpture by Gyora Novak, entitled "Links, 1965", was examined and treated during the summer and fall of 1995. Fabricated in the 1960s, this sculpture has been exhibited in a public, non-climate-controlled space for twenty years. Minimal maintenance of the sculpture has been performed during this time and although its structural condition appeared sound, its superficial condition was poor: scratches, gouges and losses marred the originally pristine and highly reflective surface.

Technical analysis revealed the materials and method of fabrication, and identified the black finish as urushi, a traditional Asian lacquer. As the artist was known to be living, attempts were made to contact him in order to discuss aspects of the sculpture's fabrication and the artist's preference for its display configuration. Because of the future exhibition plan for the sculpture, non-traditional materials and methods were used for treatment of the lacquer surface. Proprietary materials were ultimately utilized because of their effectiveness, as well as time and budget constraints and the environment to which the object would be exposed. Since consultation with the manufacturers of the materials used in the treatment and the Material Safety Data Sheets (MSDS) were non-conclusive, materials analysis was performed in-house in order to complete thorough documentation of the conservation treatment and to aid in determining the applicability of these proprietary materials for future conservation projects.

This presentation will focus on issues relating to the conservators' rationale and choice of conservation materials based on the scale, the kinetic nature and the future exhibition configuration and site of the sculpture.

Introduction

To conserve a living artist's work of art, it is imperative to attempt to make contact with the artist in order to more accurately ascertain, and to seriously analyze, what role it is that we play as conservators. For this reason, I was determined to pursue Gyora Novak, the artist on whose sculpture this paper focuses. As a conservator of the works of living artists, I continually attempt to define my precise role. Do we not, as advocates for the artwork, have an obligation to record often previously undocumented working methods and materials? As conservators, do we not have more intimate knowledge of this information than, for instance, many art historians? To what extent and how vigilantly should we seek out and establish how living artists envision their sculpture evolving throughout time, in some cases
intentionally deteriorating either structurally or superficially? Should we not attempt to contact and inform them that their work is undergoing conservation, involving them in the process, pursuing discussion regarding why certain materials and procedures are being utilized? Ultimately what are or should be our ethical and legal protocols, procedures or standards?

In an effort to determine the most "accurate" display configuration for this sculpture entitled "Links, 1965", I sought out the sculptor. A series of photographs existed in the institution's files recording a variety of visual interpretations, and there were unresolved questions that came up during the course of the examination which I felt required answers only the artist could provide. Were there specific curatorial considerations which had gone into the previous display decisions? What role should the conservator have in these choices? And, logically, shouldn't a living artist be consulted if possible to determine the future exhibition configuration if it seems ambiguous? It is interesting to note that throughout the duration of the examination and treatment, we received numerous inquiries regarding the background of, and the exact materials used to create, this sculpture. It became clear that there was ambiguity in the visual reading of the surface and a lack of understanding of the quality of the materials and their execution, as well as of the engineering and mechanical details that had been used in its manufacture. I believe education of the public will always be a large component of our roles as conservators.

**History of Acquisition**

"Links" is among ninety-two two-dimensional and three-dimensional works of art which were purchased between 1966 and 1973 representing examples of the most important artists living and working in New York State. This concentration of art on permanent exhibition at the Governor Nelson A. Rockefeller Empire State Plaza in Albany was the vision of its namesake and is dedicated to the people of New York State. This collection represents one of the first organized collaborations of modern art for the public in the United States. The above-ground, outdoor space in which numerous sculptures are exhibited measures approximately thirty-five acres, while the below-grade exhibition area is one-quarter mile in length. The chief architect of the Plaza was Wallace K. Harrison, well known for his love of modern abstract art which he incorporated into many of his architectural creations (Empire State Plaza Art Commission, 1987).

An Art Commission, appointed by Governor Rockefeller in 1965, was responsible for the selection of the modern, abstract art which was to ornament the government buildings. Rockefeller and his art commission were dedicated to abstract art, which they believed to be "the most important development in contemporary American art" (Empire State Art Commission, 1987). The collection focuses on art created in the sixties, contemporary with the buildings which house it. No additional acquisitions have been made to the collection since its inception.
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Four-fifths of the ninety-two works were purchased directly from New York galleries for the Plaza Art Collection; sixteen art works were commissioned. The artists in the latter instance were provided with architectural blueprints. Several of the artists were personally invited to select sites for their art once it was purchased by the commission (Empire State Art Commission, 1987).

The sculpture "Links" by Gyora Novak was purchased from a New York City gallery in 1967 (Figure 1). The prototype for this sculpture had been previously on display at the Whitney Annual from December 16, 1966 to February 5, 1967 and is documented in the Whitney Museum of American Art 1966 Annual Exhibition of Sculpture and Prints catalog. The entire "Links" collection is comprised of ten sculptures and had been previously exhibited in its entirety at the Poindexter Gallery in New York City in 1956 (Novak, personal communication).

An exact copy of the "Links" exhibited at the Whitney was then commissioned from the artist and sent directly from Japan to Albany, New York (Novak, personal communication). This piece was purchased using funds designated for "Wall Sculpture on the Concourse Level Lobby" (Curatorial files). The sculpture is currently located at the base of the Justice Building which is at one end of the underground or concourse level. This concourse serves as a self-sufficient underground world for the state workers who would rather not venture out for six months of the year due to the harsh upper New York State winters. Trade shows and festivals, florists and exercise demons create an obstacle course on the concourse most days.

The environment in the concourse is set for human comfort. As access to the out-of-doors is located at several points throughout the concourse, sensors which regulate the relative humidity and temperature are only found in the office areas on the higher levels. The sculpture faces a small convenience store and at one time was situated directly above a temporary newsstand.

History of Exhibition: Placement, Technique and Configuration

A memorandum regarding the installation of the sculpture, dated September 17, 1974, from the architects Harrison and Abramovitz to the Office of General Services suggests a method of hanging the 12', 360 lb."Links" sculpture. It recommends "the use of an eye bolt and black nylon cord having a 1000# safe working load, using a neatly made and trimmed clove hitch". It then goes on to instruct: "To tie the remaining end of the nylon cord to the sculpture using a neatly made bowline knot. The hanging height of the sculpture was to be determined by the architect" (Curatorial Files).

A letter dated August 23, 1974, states that the architect (Mr. Harrison) will place the sculpture in its exact exhibit location. The artist has indicated that a set of instructions and a
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set of wedges for disassembling the fifty-four parts of the sculpture were originally enclosed when the work was sent from Japan. To date, the whereabouts of these wedges is unknown.

From 1980-1987, "Links" was exhibited in a linear format. In 1986 there was an environmentally unstable period when many urushi fragments were placed in an envelope and subsequently in the object file (Curatorial Files).

The copy label and records on file describe the sculpture entitled "Links" by Gyora Novak as being composed of "lacquer". This term has been known to have been used to refer to a variety of materials such as auto body paint, imitation lacquer or japanning as well as true lacquer, which was used for this sculpture. It is astounding to most spectators, including the author, that this grand sculpture measuring 12' 6" and weighing 360 lbs. could be composed of this ancient and supremely elegant, durable yet sensitive material known as true lacquer or urushi. Interesting enough, many of the people who see the sculpture on a daily basis have assumed it to be composed of plastic or metal.

History of Conservation

Concern over the future conservation needs of the full collection are voiced in the foreword to the 1987 book entitled "The Empire State Collection: Art For the Public". In 1976, instability in both the two-dimensional works on exhibit on the concourse level and the three-dimensional works exhibited on the Plaza outdoors was noted. Many of these works had only been on display for one year. In 1978 conservation attention began to be administered through the Albany Institute of History and Art. Education of the public was considered a major part of the effort to protect the collection and deter vandalism (Curatorial Files). In 1980, the Williamstown Art Conservation Center, formerly the Williamstown Regional Art Conservation Laboratory, began to provide regular maintenance and formal conservation treatments as needed for this collection.

Historical Background

1. The Artist

Gyora Novak, born in Israel in 1934, has been active as a self-taught artist for over four decades in both Europe and the United States. He has worked in soft tissue paper, a variety of metals, terracotta, wood and urushi as well as other media. Early on, many of his ideas were expressed on a large or over life-size scale, culminating in such monumental environmental statements as the following:

"York 1190 Remembered" commemorates the massacre of most and the subsequent suicide of
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the remaining 350 Jewish people in York, England in 1190 A.D. The existing fourth generation stone fortress/tower (Clifford’s Tower, managed by the English Heritage) has been blanketed by 200,000 yellow daffodil bulbs which bloom in memory on the anniversary date of the massacre. A cast iron fence, surrounding the monument, will be designed to resemble fire damaged wood symbolizing the burning of the wooden tower which originally stood on the site. As part of this project, the artist wrote a lament and composed a score which has been recorded by musicians from the London Symphony Orchestra and was played on the 805th anniversary of the massacre in 1995. This interdisciplinary project not only focuses on a single tragic event in history, but is symbolic in relating atrocities currently plaguing the world. In point, it is a living sculpture (Novak, personal communication).

Another monumental and uniquely interdisciplinary project currently being directed by this artist is the proposed new Gate to Jerusalem. The gate is to span the new eight lane segment of the main highway leading into the city, and will be constructed out of a contemporary composite material such as that used by NASA as a rocket coating. Nine years in the planning phase (1979-1987), this project has involved several hundred professionals all of whom have volunteered their expertise towards this goal. This project has been in abeyance for some years because of political unrest in the Middle East.

Gyora Novak speaks like a visionary, expressing his beliefs in the "oneness" of humanity. He rejects the notion that his work is political and states that it is simply about the universality of people and what we all have in common, not about what sets us apart. He successfully strives to stretch his ideas to their ultimate goal, treading the parallel paths of a dreamer-realist. His projects typically incorporate numerous highly-regarded professionals including engineers, philosophers and musicians.

2. The sculpture

The "Links" in particular is intriguing and mesmerizing because of its simplicity and elegance. The repeating circular forms, although exactly the same in size, orient themselves by design in completely different spatial planes once hung as a whole, providing the spectator with infinitely diverse three-dimensional compositions. The sculpture is kinetic and creaks as it rotates. The saturated black coloration, the high gloss and ultra-smooth surface of the urushi reflects so brilliantly that it possesses a pristine quality. A set of artist-drawn blueprints exist which graphically represent the artwork and are a part of a larger graphics folio comprised of 160 pages.

Information gleaned in a personal interview with the artist revealed that the complex construction of the fifty-four interlocking units, six units comprising each of the nine interlocking links, provide repetition of line within each link, which is then mirrored in the repetition of the circles. This simplicity, purity and repetition of form and line is symbolic of
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a basic building block, a sort of common denominator that can be found in life and its experiences. In short, there are countless nuances which will continue to enrich the obvious "even-uneven" composition.

Although the sculpture was conceived of in the United States, the search for purity and excellence of lacquer execution, an age-old eastern tradition, led the artist on his first trip to Japan, where he spent six months in the town of Takamatsu on Shikoku island. Through a Japanese artist Novak had met in New York City, he was able to obtain the requisite formal introduction to the governor of that prefecture. Once the proper protocol had been followed, Novak was able to work with a master carpenter and a traditional urushi artisan to execute the final design of the sculpture. While the artist himself had previously worked out the engineering concept of the six overlapping and staggered, bisected and dissected components of each half-ring, held together by pegs and corresponding holes, the master carpenter was instrumental in the final choice of the sekura or cherry wood. This wood was selected for its characteristics such as strength and mechanical stability.

The unusual method of construction, which incorporates three 120 degree arches on the front face interlocking into three 120 degree arches on the reverse face, with one side staggered or pivoted 60 degrees, was designed by the artist himself. Once in Japan, he worked with a master carpenter who designed a machine to create these three-dimensional arched forms; each individual unit being composed of three laminated pieces of cherry wood adhered with the grain oriented perpendicular to the previous and subsequent layers. The master carpenter's stamp can be seen here as N (Figure 2). The incised angular mark adjacent to the N is Novak's name in Hebrew. An artist from a traditional lacquer family executed the urushi application achieving the precise surface typical of the medium. Through an interpreter, Novak discussed the qualities he wished to see reflected in the finished product and made his final selections from a variety of options presented to him by the Japanese artisans. Urushi was selected by the artist, in order to express the sculptural concept for many reasons, including its long-standing historical tradition, the quality of the finished product, the respect the artist had for the skill required in its application and the trust and partnership involving the carpenter, the lacquer artisan and the conceptual artist.

While in Japan the artist came up with five solutions to the "Links" concept, devising ten sculptures, five each in round and square. Of the five round and square solutions there was one black lacquer, one red lacquer, one oiled Japanese oak (keyek) and two of raw cedar (one with a burned, the other with a brushed, surface). Each particular medium was also of a unique size differentiating it from the other sculptures and media. Although the finished sculptures are composed of nine interlocking units, a tenth link was manufactured and left in Japan as a prototype or working model from which the artist or future client could order additional sculptures or subsequent commissions. This sculpture is such a commission; it was ordered directly from Japan and arrived in Albany in 1968.
Although one might wonder why these simple and repetitive forms had not been cast in molds in a polymer medium such as fiberglass, it is the artist's opinion that in the 1960's the cost of creating art in Japan was relatively inexpensive as compared to working in fiberglass with sculpture fabricators in New York City. The choice of urushi specifically was important because the medium more acutely represented the expression of the sculpture, the simple elegance, the beauty of repeating images mirroring the repetition of the lacquer layers. Urushi simply defined and embodied the purity of the sculptural form and ultimate solutions.

Examination

1. Microscopy

Examination of small samples of the lacquer layers showed three or more dark brown/black coating layers over a thick brown preparation layer. To better resolve the number of coating layers and provide material for transmitted infrared analysis, thin sections (circa 5 micrometers) were cut from an unmounted layered sample using a Sorvall Ultramicrotome MT-1. Examination of the thin-section samples using light microscopy (transmitted polarized and reflected fluorescence illumination) showed seven layers ranging in thickness from 6-19 micrometers, for a total thickness of approximately 0.17 millimeters (Figure 3). The surface layer shows fissuring, and particles are distributed along the surface of each layer, presumably evidence of the urushi process. The brown preparation layer was studied by IR and SEM and appears to be composed of kaolin and a mixture of other iron-earth materials. The analysis of particle samples of the finish and step scans through the thin-section using Fourier transform infrared (FT-IR) microspectroscopy confirmed the presence of urushi.

2. X-radiography

In order to study the fabrication technique (substructure) of the sculpture, one section of a ring was x-radiographed using a Picker portable x-ray unit (Catalogue 805D, SN 284). The tube was 90 cm from the film plane. 'Industrix' film and developer were utilized. Both the cross-section and lateral surfaces were studied. The exposures which yielded the best results were 40 kv and 5 ma at 6 minutes for the lateral view, and 35 kv and 5 ma for 9 minutes for the cross-sectional view. The objective was to determine whether or not traditional methods of manufacture had been employed. The individual lacquered units are each composed of three layers of wood that have been adhered together (Figure 4). No additional methods of reinforcement as referenced in the literature appear to have been utilized. A fabric layer is visible, both in the x-radiograph (Figure 5) and to the naked eye upon close inspection of the urushi surface; this rests directly on top of the wooden substrate (Figure 6). The fabric layer was clearly visible in areas of loss as in most cases the surface losses were limited to the urushi layers only. Other manufacturing details include the centering point from a drill for
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the dowel receivers (holes).

3. Ultraviolet

Longwave ultraviolet visible light fluorescence revealed a slightly orange/brown fluorescence.

Condition

The overall condition of the sculpture when it arrived at the lab was fair. The wood appeared structurally sound and no cracks or other structural insecurities were observed during examination. However, the surface of the urushi was marred with scratches, and white and brown abrasions from unknown sources. Cleaving of the urushi was evident in localized areas. Blisters or pockets had also formed where the urushi was no longer attached to the underlying substrate. Losses in the lacquer layer were noted, especially along the interior edges where the bisected halves met, exposing the underlaying fabric layer that covered the wooden substrate. Old repairs were visible where inpainting had occurred without filling. The surface was grimy overall because of exposure on the underground concourse to two decades worth of air-borne debris, including (until recently) cigarette smoke and possibly accumulated food grease from the surrounding restaurants.

Treatment

1. Proprietary materials: their selection and use in treatment

The treatment of the "Links" involved two components: (1) stabilization of the flaking/detaching urushi layers and (2) cosmetic compensation of the losses, including superficial polishing of the marred surface in order to remove the vestiges of twenty years of exhibition.

Proprietary materials were ultimately selected because of their individual qualities which fulfilled the requirements for display of this sculpture, as well as the time and budget considerations for this treatment.

2. Consolidation

The first step was the consolidation of surface cracks, areas of insecure or cleaving urushi, air pockets and loss areas. Both pigmented microcrystalline wax and Acryloid B-72 were considered. Acryloid B-72 was determined to be the best choice. Varying viscosities of this
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resin, in acetone, were injected into the cracks or pockets using a hypodermic needle and syringe. In other cases, the resin was simply applied by brush and used as an isolation layer prior to infilling. All cracks and losses were isolated with Acryloid B-72 prior to filling. Blisters were filled with Acryloid B-72 resin in order to support the uplifting lacquer without attempting to return the deformed lacquer to plane.

3. Cleaning versus polishing

Prior to beginning the second step, consideration was given to exactly what kind of surface quality should be achieved. After approximately twenty years of display in an open air environment, a significant build-up of air-borne debris was evident on the saturated black surface of the sculpture. Additionally, scuff marks in a variety of colors disfigured the surface, most likely from direct contact with an adjacent marble wall and other surfaces.

Polishing of ancient lacquer would not be considered ethical or necessary in a modern 1990's conservation treatment. What should be the ethical options in cleaning an example of modern 1970's urushi which had once been highly polished? Fortunately the opportunity to meet with the artist and discuss his original intent confirmed my suspicions that this sculpture should be returned to a highly reflective, pristine surface.

Dry methods (such as grated erasers) were tested as well as wet methods including saliva, dilute aqueous solution of Orvus, and organic solvents such as acetone and ethanol. Fine abrasive techniques such as the use of Micro mesh papers (6,000-12,000 grit) and other more traditional fine abrasives such as alpha alumina were also tested locally on areas where disfiguring white scuff marks were present from contact with an adjacent marble wall. The colored scuff marks, from unknown sources, were tested for ease of removal.

Micro-Gloss Liquid Abrasive, a proprietary solution that is marketed for use with the Micro-Mesh papers, was tested and appeared to be the least visually abrasive in that it did not appear to scratch the surface of the urushi. Micro-Gloss is a liquid which according to the instruction booklet does not contain any waxes or silicones. It is advertised as containing a "uniformly graded abrasive grain in suspension" (Information Booklet, p. 2). Its claim to fame is that it removes "hairline scratches, haziness and halos". It also purports to contain "no fillers or cover-ups that cause yellowing" (Micro-Surface Finishing Products, Inc.). Application of the Micro-Gloss product was straightforward per instructions, using lintless pads (Multilith) until no Micro-Gloss was left on the surface detectable to the naked eye. The Material Safety Data Sheet (MSDS) revealed that it is composed of alumina. Discussion with the technical representative at Micro- Surface Finishing Products, Inc. in Wilton, Iowa revealed that the product is composed of alumino-silicate particles suspended in a hydrocarbon-in-water emulsion and that the particle size of the abrasive is supposed to be less than one micron. The manufacturer reiterated that the best way to utilize the product most
effectively is to use a flannel pad in conjunction with light pressure.

Subsequent analysis at WACC confirmed the presence of alumino-silicates and titanium dioxide in a hexanes-in-water emulsion. Most particles were smaller than 5 micrometers, but a minor proportion of particles in the range of 2-10 micrometers was observed.

4. Filling

Filling of the losses was the next step. For most objects, the optimal fill should be different in chemical composition than the original. In this case, a solution which was chemically different than the urushi while physically imitating the hardness and gloss of this lacquered surface was desired. Ideally, the fill material should be extremely hard and durable, given the types of damage that had been observed on the surface of the sculpture and the fact that the sculpture was kinetic and prone to abrade itself. As the sculpture is not and would not be protected by physical barriers, enclosed in a case or in a filtered environment where air-borne debris would not be an issue, the fill needed to repel potentially damaging dust and dirt. A variety of pastes were concocted including Acryloid B-72 bulked with micro-balloons, Beva bulked with Cabosil, epoxy systems such as the West System epoxy bulked with dry pigments, Milliput, polyesters and high melting point microcrystalline waxes. In the end Milliput, a proprietary two-part epoxy system, heavily bulked with titanium dioxide was selected for durability, ease of application, efficiency and health considerations. This material also fulfilled the requirements of the kinetic nature of the sculpture, the time/budget constraints of the project as well as the nature of the non-traditional museum climate to which the sculpture would return.

Milliput, which is manufactured by the Milliput Company in Mid Wales, is available in four colors (Yellow/Gray, Silver Gray, Terracotta and Superfine White). It is a two-part system composed of an epoxy resin and hardener in putty form, advertised by the company as self-hardening, non-shrinking, highly adhesive and tough. Both the epoxy and hardener are bulked to a pliable modelling clay consistency using inert particles. Numerous requests were made to the company and distributors for a MSDS but to no avail. Although this material appears to be in wide use for the repair of high-fired ceramics, when attempts were made to obtain information on its chemical constituents from users in the conservation field, no one appeared to have either a MSDS or any technical information as to its exact constituents. Therefore technical analysis was undertaken at WACC. Two colors of Milliput were analyzed: superfine white and standard yellow-gray. Infrared analysis of acetone-soluble extracts showed the epoxy resin to be a bisphenol A type epoxy, and the hardener to be a polyamide resin. Particle analysis by light, electron and infrared microscopy showed the presence of kaolinite in both the epoxy and hardener samples. Titanium dioxide was added to the superfine white components as a whitener.
Although polyamide resin hardeners are less toxic than amine hardeners, they are less color stable to light exposure (Horie, Materials for Conservation). However, titanium dioxide being a dense, opaque, inert pigment (Mayer, The Artist's Handbook) with a high, refractive index would appear to have a stabilizing effect on the product's aging process. It is said "to be very stable and have the greatest hiding power of any of the white pigments...It is unaffected by heat, by dilute acids and alkalis, and by light and air" (Gettens and Stout, Painting Materials). Therefore the addition and presence of titanium white to this epoxy would appear to have a stabilizing effect on the product's aging process.

Reversibility should always be a primary consideration in any treatment. Our credo, The Code of Ethics and Standards of Practice, states this. However as Objects conservators we know that there are exceptions to the rule as was discussed in Buffalo at the 1992 AIC pre-session which focused on the conservation practices of outdoor sculpture. Other more general practices such as materials used for consolidation and application techniques thereof are theoretically reversible but most likely not in practice.

Milliput, being an epoxy putty, would not be a first choice for fill medium for lacquer-coated wood in most instances. If this object were residing in a climate controlled museum, or were not a kinetic sculpture apt to receive abrasion of its surface, hardness of the fill medium would most likely not have been such an issue. However, the white coloration of the fill medium allows the future conservator to easily identify the location of the fill should mechanical removal be necessary. The Milliput was placed over an isolation layer of Acryloid B-72 and was approximately 0.17 millimeters in depth.

5. Surface Reintegration

The Milliput infill created a fairly glass-like foundation. Allowing siliconized Mylar to lay against the Milliput while it was curing achieved a surface even closer to that of the lacquer. Additional sanding/polishing with the highest grade Micro Mesh papers (8,000-12,000) aided in replicating the surrounding, pristine, urushi surface.

Tinting of the Milliput was experimented with. Tinting the material in advance would be efficient; disadvantages would include the increased difficulty in locating the fills once polished or coated. However, it turned out that Milliput does not tint easily with dry pigments, Orasol dyes or acrylic paints, either prior to combining the two parts or after, and the idea of tinting the fills was abandoned.

It was essential to have a consistently reproducible, thin layer of saturated black pigmentation that was void of brush strokes. The surface of the surrounding urushi begged an ultra-smooth, glossy in-fill. These criteria appeared to be most easily fulfilled by utilizing a spray technique, as opposed to brush. The airbrush technique and a black aqueous acrylic
pigment were ultimately selected (Figures 7 and 8).

All areas to be inpainted were first isolated using Frisket, polyethylene sheeting and Kraft paper to mask out all but the areas to be airbrushed. This process minimized or avoided over spray, a primary drawback of the airbrush technique. The Frisket which was utilized was composed of an acrylic adhesive with a PVC carrier. Although PVC is not conservation-grade and is an inherently unstable material, the carrier was not considered to pose a threat to the surface of the artwork because of its very limited time in contact with the surface.

A clear coating was utilized to protect the paint layer and to simulate the gloss of the surrounding urushi. The product Aqueous Euro Gloss Glaze proved to be very reflective and durable. Multiple attempts were made by telephone and fax to obtain MSDSs for this product were unsuccessful. Although the company claimed to have them, they were never sent. The irony of this is that on the inside cover of the I.P.G.R. catalog they state that "all of our products are extremely researched, developed and tested by Klein Studios" and "artisans the world over have come to rely on I.P.G.R., Inc., products and technical support". I would be very interested to know if anyone else has been successful in obtaining a MSDS for this product. In-house analysis of a dried film of the Aqueous Euro-Gloss Glaze using infrared microscopy showed the presence of an acrylic resin.

Finally, a protective layer of microcrystalline paste wax (Renaissance Wax) was applied to the front surface overall and was buffed off with cotton pads.

Display

Having observed photographs of the sculpture in different configurations in both the curatorial office files and on the cover of various museum annual reports, I was in a quandary about which display tactic to pursue. Additional complications included concerns about its previous security and that of other sculptures hanging in this public space. Having heard stories of how this sculpture literally saved the life of an employee who hung from the sculpture until he was rescued, I wanted to think seriously about the future health and safety of the sculpture.

The artist was queried as to his preference for the sculpture's ideal exhibition configuration and it was determined that the sculpture could be accurately represented in many different arrangements. Therefore, the decision was made to hang the sculpture higher than before. A draped positioning of the sculpture, similar to an earlier example that had been photo-documented, was ultimately settled upon for both safety and aesthetic reasons.

The order in which the individual links were ultimately hung was based upon their condition, with those in better condition hung in the most visible positions. Previous statements by the
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artist had indicated that the links were absolutely identical and interchangeable. During disassembly, it became quite obvious that certain links were easier than others to reassemble. While careful attention was paid to the order in which the interlocking units within each link were arranged, it was observed that significantly varying amounts of pressure had to be utilized during the installation of the link halves.

Once eight of the links were reassembled and hanging in an interlocking fashion, the sixth or final unit of the ninth link simply would not fit into place as the others installed prior to it had. Two of the four pins and corresponding holes were not in alignment and were off by as much as 1/4". After it was determined that this link was "A" in the series and therefore had borne the majority of the weight (360 lbs) for as much as two decades, it seemed possible that the six units comprising the link could have individually distorted enough to have warped the link as a whole, making the fit difficult. Surprisingly, however, the link did not appear visually distorted. Once back on the ground, the six units were able to be reassembled by using equal pressure simultaneously on all surfaces, using a cork sheet as a cushioning interleaf to work all the pegs and respective holes into their original alignment. Because of this distortion the final link had to be hung assembled and not interlocked as the others had been.

Conclusion

This collaboration with the artist and the conservation scientist providing information which will be a useful, practical contribution to the urushi database for future comparisons and related research, given this sculpture's documented Japanese provenance. In addition, the use of this traditionally Eastern material by a Western artist is an interesting feature.

Collaboration with a conservation scientist allowed three commercially available products (Micro-Gloss, Milliput and Aqueous Euro-Glaze gloss) to be analyzed by FT-IR microscopy and to be used with less trepidation by the conservators. Once again it was confirmed that the usage of proprietary, commercial products is without a doubt a risky business. To use them as viable options and to use them responsibly requires and attempt to obtain all available technical literature, often a frustrating and less than fruitful endeavor. Material Safety Data Sheets may not exist if the product is produced outside of the United States. Information which supposedly exists may not ever materialize despite the most diligent efforts by the researcher. "Trade Secrets" additionally complicate the process of information gathering.

As a result of selecting commercial products for use in this treatment, a useful discovery was made about the best use of Milliput. While it can successfully fulfill requirements for certain treatments, the conservator must be aware of its limitations. Exposure to ultraviolet wavelengths of light could potentially contribute to chemical instability. The application of a
subsequent paint layer would appear to retard this process.

The ability to analyze materials in-house is a marked asset for the conservator. But even then, as we found in this investigation, the chemical components or percentages contained within a commercial product can change at a moment's notice, as was the case with the Micro-Gloss. For example, between the fall of 1995 and the spring of 1996, the MSDS that was held at the lab became inaccurate. Thus it is incumbent upon all of us as conservators to continually inquire when purchasing new orders of commercial products as to the current formulation of the product and if there have been any recent changes. Updated records should be kept together with the respective products so that an old MSDS is maintained for containers of the older product, and an updated MSDS for new batches of the same product.

A significant factor during the course of this treatment was the budget/time allotment/restriction dictated by the owner/client. Originally a project/cost estimate was proposed at 135 hours. The client responded that funding was available for only 67 hours. Issues such as these are a reality in the current financial climate at both the federal and state government levels. Many conservators are thus encouraged to tailor treatments to budgets while continuing to place the stabilization of the object as the ultimate priority. When the conservator is presented with the "bottom line" first it encourages creative problem solving.

Finally and most importantly, collaborating with a living artist on whose work a conservator is to embark not only updates the artist on its current condition but also broadens the conservator's awareness of the mechanics of manufacture as well as the concepts or principles on which the work of art is based. Building a bridge between the artist and the conservator hopefully demystifies their respective worlds and enables conservators to better serve artists and preserve their work as the artist, and not the conservator, envisioned.

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Figure 1. "Links", by Gyora Novak.

Figure 2. Pencil rubbings of artist and artisan signatures.
Figure 3. Thin section of lacquer.

Figure 4. X-radiograph of cross-section of individual wooden member.
Figure 5. X-radiograph of top of individual wooden section.

Figure 6. Detail of surface loss, revealing fabric layer.
Figure 7. Detail of masking during airbrushing.

Figure 8. Detail of airbrushing, prior to waxing.